Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name : Electromagnetics

Subject Code : 4TE05EMS1 **Branch: B.Tech (EC)**

Semester : 5 **Date : 30/11/2018** **Time : 10:30 To 01:30** **Marks : 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) What is a scalar quantity? Give an example
b) What is cross product of vectors?
c) What are two methods of vector addition?
d) Give Gauss's Law.
e) What is dipole?
f) Provide equation stating relation between electric field intensity and electric field density?
g) State Skin effect.
h) Define Polarization.
i) State equation of Stokes' Theorem.
j) Give Lorentz Force Equation, showing force dependency on Electric and Magnetic Force.
k) State Faraday's Law of Electrostatics
l) Give Ampere's Circuital Law.
m) What are intrinsic semiconductor materials?
n) Give Poisson's equation in terms of volumetric charge density.

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(a) List out Maxwell's equations in integral & differential form. **07**

(b) State Biot-Savart law and explain in detail. **07**

Q-3 **Attempt all questions** **(14)**

(a) Describe Cartesian and Spherical coordinate system. **08**
(b) Explain Conductor, Semiconductor and Insulator with energy band diagram. **06**

Q-4 **Attempt all questions** **(14)**

(a) State and Prove Uniqueness Theorem **07**

	(b)	Explain Poisson's and Laplace equations	**07**
Q-5		**Attempt all questions**	**(14)**
	(a)	Derive wave equation for x-polarized TEM electric field in free space.	**07**
	(b)	The electric field intensity in polystyrene, having relative permittivity of 2.55, filling the space between the parallel-plate capacitor is 10 kV/m. The distance between the plates is 1.5mm. Calculate (i)Electric Field Density(D) (ii)Polarization (P) (iii)The surface charge density of free charge on the plates (iv)The surface density of polarization charge (v)The potential difference between the plates.	**07**
Q-6		**Attempt all questions**	**(14)**
	(a)	Using neat sketch define position vector. By giving example explain Gradient, Divergence and Curl.	**07**
	(b)	The potential field of a system of charges.	**07**
Q-7		**Attempt all questions**	**(14)**
	(a)	What is Current Density? Explain continuity of Current.	**07**
	(b)	Describe Conductor Properties and Boundary conditions.	**07**
Q-8		**Attempt all questions**	**(14)**
	(a)	Describe Poynting's Theorem.	**07**
	(b)	Perform transformation of Cartesian Coordinate System to Cylindrical Coordinate System and Vice Versa.	**07**